APPENDIX B - INSPECTION GUIDE FOR FLOOD CONTROL WORKS

INSPECTION GUIDE FOR FLOOD CONTROL WORKS

Name of Project: _____ **Date** _____

Public Sponsor: _____

SUMMARY OF INSPECTION:

THE PROJECT CONDITION AS A RESULT OF THIS (INITIAL)(CONTINUING) *(circle one)* **ELIGIBILITY INSPECTION IS:**

- ☐ **ACCEPTABLE**
- ☐ **MINIMALLY ACCEPTABLE**
- ☐ **UNACCEPTABLE.**

[NOTE: Refer to Page 10 of the Inspection Guide for Rating Codes for Individual Rated Items, and Project Condition Codes used in this inspection.]

CORPS OF ENGINEERS INSPECTORS:

_____ _____

_____ _____

PUBLIC SPONSOR REPRESENTATIVES

_____ _____

COMMENTS:

☐ **Check if additional comments are attached.**

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Figure B-1. Inspection Guide for Flood Control Works

RATED ITEM	S	M	U	EVALUATION	
SECTION I				***FCW ENGINEERING - FOR USE DURING INITIAL ELIGIBILITY INSPECTION OF NONFEDERAL PROJECTS***	
1. Level of Protection					The designed section is for an exceedance frequency greater than 10% chance (10 yr.) with minimum freeboard of 2 feet/60 cm (urban levee) *or* the designed section is for an exceedance frequency between 20% to 10% chance (5-10 yr.) with minimum freeboard of 1 foot/30cm (agricultural levee).
2. Erosion Control				S	Erosion protection in active areas is capable of handling the designed flow velocity for the level of protection for the entire FCW.
				M	Erosion protection is capable of handling the designed flow velocity for the level of protection for 75% or more of the FCW.
				U	Erosion protection measures protect less than 75% of the FCW; or if erosion protection was not present and there is evidence indicating a need for erosion protection.
3. Embankment				S	Fill material for embankment is suitable to prevent slides and seepage for the existing side slopes. Fill material is uniform and adequately compacted through the entire FCW.
				M	Material is adequate and suitable to prevent major slides and capable of handling localized seepage for the existing side slopes. Fill material is uniform and adequately compacted in 75% or more of the FCW.
				U	Material is unsuitable and likely to cause numerous slides and allow excessive uncontrolled seepage. Fill material is not uniform, or there is no compaction and evidence indicates a need for compaction.
4. Foundation				S	Foundation materials will not cause piping, sand boils, seepage, or settlements that reduce the level of protection.
				M	Foundation materials may show signs of excessive seepage, minor sand boils, and localized settlements.
				U	Foundation materials are unsuitable and likely to cause excessive uncontrolled seepage, sand boils, and/or piping.
5. Structures				S	Structures are capable of performing their design functions and show no signs of failure.
				M	Structures are performing their design functions but show signs of overtopping and bypassing flows.
				U	Structures are not performing their design functions or show signs of structural failure.

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RATED ITEM	S	M	U	EVALUATION	
SECTION II				***FCW MAINTENANCE - FOR USE DURING ALL INSPECTIONS***	
6. Depressions				S	Minimal depressions or potholes; proper drainage.
				M	Some depressions that will not pond water.
				U	Depressions 15 cm (6") vertical or greater which endangers the integrity of the levee.
7. Erosion				S	No erosion observed.
				M	LEVEE: Erosion of levee crown or slopes that will not interrupt inspection or maintenance access. OTHER FCW: Erosion gullies less than 15 cm (6 inches) deep or deviation of 30 cm (1 foot) from designed grade or section.
				U	LEVEE: Erosion of levee crown or slopes that has interrupted inspection or maintenance access. OTHER FCW: Erosion gullies greater than 15 cm (6 inches) or deviation of 30 cm (1 foot) or more from designed grade or section.
8. Slope Stability				S	No slides present. Erosion of slopes less than 10 cm (4") deep.
				M	Minor superficial sliding that with deferred repair does not pose an immediate threat to FCW integrity. No displacement or bulges.
				U	Evidence of deep seated sliding (60 cm (2 ft.) vertical or greater) requiring repairs to re-establish FCW integrity.
9. Cracking				S	No cracks in transverse or longitudinal direction observed in the FCW.
				M	Longitudinal cracks are no longer than the levee height. No displacement and bulging. No transverse cracks.
				U	Longitudinal cracks are greater than levee height, with *or without* some bulging observed. Transverse cracks are evident
10. Animal Control				S	Continuous animal burrow control program that eliminates any active burrowing in a short period of time. Program includes filling in of existing burrows.
				M	Animal burrows present that will not result in seepage or slope stability problems.
				U	Animal burrows present that would result in possible seepage or slope stability problems.

	RATED ITEM	S	M	U	EVALUATION	
	SECTION II - Continued				***FCW MAINTENANCE - FOR USE DURING ALL INSPECTIONS***	
11.	**Unwanted Vegetation Growth**				S	A- No large brush or trees exist in the FCW. Grass cover well maintained. CHANNELS: Channel capacity for designed flows is not affected.
					M	Minimal tree (5 cm (2") diameter or smaller) and brush cover present that will not threaten FCW integrity. (NOTE: Trees that have been cut and removed from levees should have their roots excavated and the cavity filled and compacted with impervious material). CHANNELS: Channel capacity for designed flows is not adversely affected.
					U	Tree, weed, and brush cover exists in the FCW requiring removal to re-establish or ascertain FCW integrity. (NOTE: If significant growth on levees exists, prohibiting rating of other levee inspection items, then the inspection should be ended until this item is corrected.) CHANNEL: Channel obstructions have impaired the floodway capacity and hydraulic effectiveness.
12.	**Encroachments**				S	No trash, debris, excavations, structures, or other obstructions present.
					M	Trash, debris, excavations, structures, or other obstructions present, or inappropriate activities occurring that will not inhibit operations and maintenance performance.
					U	Trash, debris, excavations, structures or other obstructions present, or inappropriate activities that would inhibit operations and maintenance performance.
13.	**Riprap/ Revetments/ Banks**				S	Existing protection works are being properly maintained and are undamaged.
					M	No scouring activity that could undercut banks/riprap, erode embankments, or restrict desired channel flow.
					U	Meandering and/or scour activity that is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence, meandering, or shoaling.
14.	**Stability of Concrete Structures**				S	Any tilting, sliding, or settling of structures, if present, has been secured, preserving the integrity or performance.
					M	Uncorrected sliding or settlement of structures of a magnitude that does not affect performance.
					U	Tilting or settlement of structures that has resulted with a threat to the structure's integrity and performance.

	RATED ITEM	S	M	U	EVALUATION	
	SECTION II - Continued				***FCW MAINTENANCE - FOR USE DURING ALL INSPECTIONS***	
15.	**Concrete Surfaces**				S	Negligible spalling or scaling. No cracks present that are not controlled by reinforcing steel or that cause integrity deterioration or result in inadequate structure performance.
					M	Spalling, scaling and cracking present but immediate integrity or performance of structure not threatened.
					U	Surface deterioration or deep, controlled cracks present that result in an unreliable structure.
16.	**Structural Foundations**				S	No scouring or undermining near the structures.
					M	Scouring near the footing of the structure but not close enough to affect structure stability during the next flood event.
					U	Scouring or undermining at the foundation that has affected structure integrity.
17.	**Culverts**				S	[a] No breaks, holes, cracks in the culvert that would result in any significant water leakage. No surface distress that could result in permanent damage. [b] Negligible debris or silt blocking culvert section. No or minimal debris or sediment present which has negligible effect on operations of the culvert.
					M	[a] Integrity not threatened by spalls, scales, or surface rusting. Cracks present but resulting leakage not affecting the structure. [b] Debris or sediment present, which is proposed to be removed prior to the next flood event, that minimally affects the operations of the culvert.
					U	[a] Culvert has deterioration such as surface distress and/or has significant leakage in quantity or degree to threaten integrity. [b] Accumulated debris or settlement which has not been annually removed and severely affects the operations of the culvert.
18.	**Gates**				S	Gates open easily and close to a tight seal. Materials do not have permanent corrosion damage and appear to have historically been maintained adequately.
					M	Gates operate but leak when closed; however, leakage quantity is not a threat to performance. All appurtenances of the facility are in working condition.
					U	Gates leak significantly when closed or do not operate. Gates and appurtenances have damages that threaten integrity and/or appear not to have been maintained adequately.
19.	**Closure Structures**				S	Closure structure in good repair. Placing equipment readily available at all times.
					U	Closure structure in poor condition. Parts missing. Placing equipment may not be available within normal warning time.

RATED ITEM	S	M	U	EVALUATION	
SECTION II - Continued				***FCW MAINTENANCE - FOR USE DURING ALL INSPECTIONS***	
20. Motors				S	All motors, if present, are operational. Preventive maintenance is occurring and system is performance tested periodically.
				M	All motors are operational and minor discrepancies are such that motors could be expected to perform through the next projected period of usage.
				U	Motors are not operational, or noted discrepancies have not been corrected.
21. Power				S	Adequate, reliable, and enough capacity to meet demands.
				U	Power source not considered reliable to sustain operations during flood condition.
22. Metallic items				S	All metal parts in a plant/building protected from permanent damage from corrosion. Gates operable.
				M	Corrosion on metal parts appears maintainable. Gates operable.
				U	Metal parts need replacement, may fail, or will not function.

REMARKS FOR SECTIONS I AND II.

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	RATED ITEM	S	M	U	EVALUATION	
	SECTION III				***FOR USE DURING ALL INITIAL and CONTINUING ELIGIBILITY INSPECTIONS***	
23.	Pump Station Size				Pump station has adequate capacity (considering pumping capacity, ponding areas, etc.) to handle expected inflow volumes.	
	SECTION IV				***FOR USE DURING ALL INITIAL and CONTINUING ELIGIBILITY INSPECTIONS***	
24.	Operations and Maintenance Manual				Operations and Maintenance (O&M) Manual is present and adequately covers all pertinent areas. All necessary updates to the Manual have been done.	
25.	Operating Log				Pump Station Operating Log is present and being used. Operators are trained on proper usage.	
26.	Annual Inspection				Annual inspection is being performed by the public sponsor.	
27.	Plant Building				S Plant building is in good structural condition. No apparent major cracks in concrete, no subsidence, roof is not leaking, etc. Intake louvers clean, clear of debris. Exhaust fans operational and maintained. Safe working environment.	
					M Spalling and cracking are present, or minimal subsidence is evident, or the roof leaks, or other conditions are present that need repair but do not threaten the structural integrity or stability of the building.	
					U Any condition that does not meet Minimally Acceptable standard.	
28.	Pumps				S All pumps are operational. Preventive maintenance and lubrication are being performed. System is periodically subjected to performance testing. No evidence of unusual sounds, cavitation, or vibration.	
					M All pumps are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next expected period of usage.	
					U One or more primary pumps are not operational, or noted discrepancies have not been corrected.	
29.	Motors, Engines, and Gear Reducers				S All items are operational. Preventive maintenance and lubrication being performed. System is periodically subjected to performance testing. Instrumentation, alarms, and auto shutdowns are operational.	
					M All systems are operational and deficiencies/minor discrepancies are such that pumps could be expected to perform through the next expected period of usage.	
					U One or more primary motors are not operational, or noted deficiencies/discrepancies have not been corrected.	**PAGE 7 OF 10**

RATED ITEM	S	M	U	EVALUATION	
SECTION IV Continued				***FOR USE DURING ALL PUMP STATION INSPECTIONS***	
30. Trash Rakes				S	Drive chain, bearings, gear reducers, and other components are in good operating condition and properly maintained.
				M	Drive chain, bearings, gear reducers, and other components are capable of performing as designed through the next flood event.
				U	Proper operation would be inhibited during the next flood event.
31. Other Metallic Items				S	All metal parts in plant/building are protected from permanent damage by corrosion. Equipment anchors show no rust or deterioration.
				M	Corrosion on metallic parts (except equipment anchors) appears maintainable.
				U	Any condition that does not meet at least Minimum Acceptable standards.
32. Insulation Megger Testing				S	Results of megger test show that insulation meets manufacturer's or industry standard. Test not more than 24 months old.
				M	Results of megger test show that insulation resistance is lower than manufacturer's or industry standard, but can be corrected with proper application of heat.
				U	Insulation resistance is low enough to cause the equipment to not be able to meet its design standard of operation.
33. Power				S	Adequate, reliable, and enough capacity to meet demands. Backup generators are on hand and deemed reliable, or feasible plan exists to obtain backup power. Backup units are properly sized, operational, periodically exercised, and properly maintained.
				U	Power source not considered reliable to sustain operations during flood condition.
34. Pump Control System				S	Operational and maintained free of damage, corrosion, or other debris.
				M	Operational with minor discrepancies. Will function adequately in the next flood event.
				U	Not operational; uncorrected discrepancies noted from previous inspections; capability to adequately function in the next flood event is suspect.
35. Sumps				S	Clear of debris and obstructions. Mechanisms are in place to maintain this condition during operations.
				M	Clear of large debris, minor obstructions present. Mechanisms are in place to deter any further accumulation during operation. Sump will function as intended.
				U	Large debris or major obstructions present, or no mechanism exists to prevent debris accumulation during operation.

	RATED ITEM	S	M	U	EVALUATION
	SECTION IV - Continued				***FOR USE DURING ALL PUMP STATION INSPECTIONS***
36.	Intake/Discharge Gates.				Functional. Electric operators maintained. (S or U only.)
37.	Cranes				Operational. Inspected and load tested in accordance with OSHA requirements. (S or U only.)
38.	Telephone Communications				Telephone communication is available in the pump station. Alternatively, two-way radio, cellular telephone, or similar device is available, or, access to a telephone is within a reasonable driving distance. (S or U only.)
39.	Safety				No exhaust leaks in building. Fuel storage/distribution meets state/local requirement. Fire extinguishers on hand, of sufficient quantity, and properly charged. Safety hardware installed. Required safety items (e.g., aural protectors) used. (S or U only.)

Remarks for Pump Station - Sections III and IV of Inspection Guide.

Instructions and Information for the Inspection Guide

RATINGS: The following terms and definitions are used in the conduct of this inspection for rating items and components of this project:

S - Satisfactory: The rated item is in satisfactory condition, and will function as designed and intended during the next flood event.

M - Marginally Satisfactory: The rated item has a minor deficiency that needs to be corrected. The minor deficiency will not seriously impair the functioning of the item during the next flood event. The overall reliability of the project will be lowered because of the minor deficiency.

U - Unsatisfactory: The rated item is unsatisfactory. The deficiency is so serious that the item will not adequately function in the next flood event, compromising the project's ability to provide reliable flood protection.

DETERMINATION OF PROJECT CONDITION CODE: The lowest single rating given for a rated item will determine the overall condition of the project. If all rated items are rated as Satisfactory, the project condition will be Acceptable. If one or more rated items are evaluated as Marginally Satisfactory, with no rated items evaluated as Unsatisfactory, then the project condition will be Minimally Acceptable. One or more rated items with a rating of Unsatisfactory will result in a project condition of Unacceptable.

STATUS: Acceptable and Minimally Acceptable projects are in Active status. Unacceptable projects are in Inactive status. Projects in Inactive status are not eligible for consideration for Rehabilitation Assistance from the US Army Corps of Engineers in the event of damage from a flood or coastal storm.

GENERAL INSTRUCTIONS.

1. Section I will be used on all IEI's.
2. Section II will be used on all CEI's.
3. All rated items in Sections I and II must have a rating given.
4. Additional areas for inspection will be incorporated by the inspector into this guide if the layout or physical characteristics of the project warrant this. Appropriate entries will be made in the REMARKS block.

FOR PROJECTS WITH PUMP STATIONS:

5. Section III and IV will be used on all IEI's and CEI's for projects with pump stations. A pump station must have the primary purpose of flood control, not interior drainage. The district will determine, based on appropriate study, if adequate capacity exists. Lack of adequate capacity mandates a rating of Unsatisfactory and a condition of Unacceptable.
6. The lowest rating for a rated item on either the levee inspection (Sections I and II) or the pump station (Sections III and IV) determines the overall project condition.
7. A non-Federal pump station located behind a Federal levee will be treated as a separate FCW, will not be incorporated into the Federal levee project, and will be inspected as a separate entity. The lowest rated item on the pump station inspection determines the project condition code for the pump station. This is independent of the Federal project inspection.
8. Additional areas for inspection will be incorporated by the inspector into this guide if the layout or physical characteristics of the pump station warrant this. Appropriate entries will be made in the REMARKS block.